What is claimed is:

1. A method for identifying an OP-1 receptor-binding analog, said analog being characterized as having substantially the same binding affinity for a cell surface receptor as OP-1, the method comprising the steps of:

(a) providing a sample containing a protein selected from the group consisting of:

(i) a polypeptide chain comprising an amino acid sequence defined by residues 16-123 of Seq. ID No. 3 (ALK-2), or an OP1-binding analog thereof;

(ii) a polypeptide chain comprising an amino acid sequence defined by residues 24-152 of Seq. ID No. 5 (ALK-3),, or an OP1-binding analog thereof;

(iii) a polypeptide chain comprising an amino acid sequence defined by residues 23-122 of Seq. ID No. 7 (ALK-6),, or an OP1 binding analog thereof;

(iv) a polypeptide chain having binding affinity for OP-1 and sharing at least 40% amino acid identity with residues 23-122 of Seq. ID No. 7 (ALK-6),;

(v) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid obtainable by amplification with one or more primer sequences defined by Seq. ID Nos. 12-15; or

(vi) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid that hybridizes under stringent conditions with a nucleic acid comprising the sequence defined by nucleotides 256-552 of Seq. ID No. 7 (ALK-6),;

(b) contacting said sample with a candidate OP1 receptor- binding analog; and

(c) detecting specific binding between said candidate OP1 receptor-binding analog and said protein.

2. A method for identifying an OP-1 receptor-binding analog, said analog being characterized as having substantially the same binding affinity for a cell surface receptor as OP1, the method comprising the steps of:

(a) providing a cell that expresses a surface receptor protein having binding specificity for OP-1 selected from the group consisting of:

(i) a polypeptide chain comprising an amino acid sequence defined by residues 16-123 of Seq. ID No. 3 (ALK-2), or an OP1-binding analog thereof;

(ii) a polypeptide chain comprising an amino acid sequence defined by residues 24-152 of Seq. ID No. 5 (ALK-3),, or an OP1-binding analog thereof;

(iii) a polypeptide chain comprising an amino acid sequence defined by residues 23-122 of Seq. ID No. 7 (ALK-6),, or an OP1 binding analog thereof;

(iv) a polypeptide chain having binding affinity for OP-1 and sharing at least 40% amino acid identity with residues 23-122 of Seq. ID No. 7 (ALK-6),;

(v) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid obtainable by amplification with one or more primer sequences defined by Seq. ID Nos. 12-15; or

(vi) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid that hybridizes under stringent conditions with a nucleic acid comprising the sequence defined by nucleotides 256-552 of Seq. ID No. 7 (ALK-6),;

(b) contacting said cell with a candidate OP1 receptor-binding analog; and

(c) detecting induction of an OP-1-mediated cellular response.

3. The method of claim 2 wherein said OP-1 mediated cellular response detected in step (c) is induction of a kinase activity, inhibition of epithelial cell growth, or induction of a cell differentiation marker.

4. The method of claim 2 or 3 wherein said cell comprises a transfected nucleic acid comprising a reporter gene in operative association with a control element derived from an OP-1 inducible protein.

5. The method of any of claims 1-4 wherein said sample further comprises part or all of a Type II serine/threonine kinase receptor protein having binding affinity for OP-1, activin or BMP-4.

6. A method for producing an OP-1 receptor binding analog, the method comprising the steps of:

(a) obtaining, by the method of any of claims 1-5, a candidate OP-1 binding analog, and

(b) producing either said candidate analog or a second OP-1 binding analog derived from said candidate and having substantially the same OP-1 receptor-binding domain as said candidate.

7. The method of producing an OP-1 receptor-binding analog of claim 6 wherein said analog produced in step (b) is by recombinant DNA techniques, or by nonbiological peptide synthesis.

8. A kit for identifying OP-1 or a candidate OP-1 receptor binding analog in a sample, the kit comprising:

(a) a receptacle adapted to receive a sample and containing a protein selected from the group consisting of:

(i) a polypeptide chain comprising an amino acid sequence defined by residues 16-123 of Seq. ID No. 3 (ALK-2), or an OP1-binding analog thereof;

(ii) a polypeptide chain comprising an amino acid sequence defined by residues 24-152 of Seq. ID No. 5 (ALK-3),, or an OP1-binding analog thereof;

(iii) a polypeptide chain comprising an amino acid sequence defined by residues 23-122 of Seq. ID No. 7 (ALK-6),, or an OP1 binding analog thereof;

(iv) a polypeptide chain having binding affinity for OP-1 and sharing at least 40% amino acid identity with residues 23-122 of Seq. ID No. 7 (ALK-6),;

(v) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid obtainable by amplification with one or more primer sequences defined by Seq. ID Nos. 12-15; or

(vi) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid that hybridizes under stringent conditions with a nucleic acid comprising the sequence defined by nucleotides 256-552 of Seq. ID No. 7 (ALK-6),; and

(b) means for detecting interaction of OP-1 or a candidate OP-1 receptor-binding analog with said protein of part (a), said OP-1

or candidate analog comprising part of said sample provided to said receptacle.

9. The kit of claim 8 wherein said means in part (b) comprises either

(i) means for detecting specific binding interaction of OP-1 or said candidate analog with said protein; or

(ii) means for detecting induction of an OP-1 mediated cellular response.

10. The kit of claim 8 or 9 further comprising a serine/threonine Type II receptor having binding specificity for OP-1, activin or BMP-4.

11. An OP-1 receptor-binding analog produced by the method of any of claims 1-7 or use of the kit of claims 8-10.

12. The analog produced by the method of any of claims 1-8, said analog

(i) comprising an amino acid sequence sharing greater than 60% identity with the C-terminal 96 amino acids of the sequence represented by Seq. ID No. 9 (OP-1, residues 335-431), and

(ii) being substantially incapable of inducing an OP-1 mediated cellular response.

13. The analog of claim 11 or 12 further having binding affinity for a Type II serine/threonine kinase cell surface receptor.

14. The analog of claim 13 wherein said Type II receptor also has binding affinity for activin or BMP-4.

15. An isolated ligand-receptor complex comprising two molecules interacting as specific binding partners, the first said molecule defining said ligand and comprising at least the C-terminal 96 amino acids of OP1 (residues 335-431 of Seq ID No. 9) or a receptor-binding analog thereof, and the second said molecule defining said receptor and being selected from the group consisting of:

(i) a polypeptide chain comprising an amino acid sequence defined by residues 16-123 of Seq. ID No. 3 (ALK-2), or an OP1-binding analog thereof;

(ii) a polypeptide chain comprising an amino acid sequence defined by residues 24-152 of Seq. ID No. 5 (ALK-3),, or an OP1-binding analog thereof;

(iii) a polypeptide chain comprising an amino acid sequence defined by residues 23-122 of Seq. ID No. 7 (ALK-6),, or an OP1 binding analog thereof;

(iv) a polypeptide chain having binding affinity for OP-1 and sharing at least 40% amino acid identity with residues 23-122 of Seq. ID No. 7 (ALK-6),;

(v) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid obtainable by amplification with one or more primer sequences defined by Seq. ID Nos. 12-15; or

(vi) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid that hybridizes under stringent conditions with a nucleic acid comprising the sequence defined by nucleotides 256-552 of Seq. ID No. 7 (ALK-6),.

16. The complex of claim 15 further comprising part or all of a Type II serine/threonine kinase receptor .

17. The complex of claim 16 wherein said Type II receptor also has binding affinity for activin or BMP-4.

18. The complex of any of claims 15-17 wherein said first molecule defining said ligand is an OP-1 receptor-binding analog comprises part or all of the proteins selected from the group consisting of 60A, BMP-5, BMP-6, Vgr-1, OP2, OP3 and receptor-binding amino acid sequence variants or xenogenic homologs thereof.

19. An isolated binding partner having specific binding affinity for an epitope on a ligand-receptor complex, said complex being characterized as comprising an OP-1 protein or an analog thereof in specific binding interaction with the ligand binding domain of a cell surface receptor defined by Seq. ID No. 3 (ALK-2), 5, or 7, or an OP1-binding analog thereof; said binding partner having substantially no binding affinity for the uncomplexed form of said OP-1 protein or OP-1 protein analog.

20. The isolated binding partner of claim 19 wherein said binding partner is further characterized as having substantially no binding affinity for the uncomplexed form of said cell surface receptor protein or said analog thereof.

21. The binding partner of claim 19 wherein said binding partner is a monoclonal or polyclonal antibody.

22. Use of the OP-1 receptor-binding analog of any claims 11-14 in a method for

(i) antagonizing OP-1 binding to a cell surface receptor; or

(ii) antagonizing induction of an OP-1 mediated cellular response.

23. The use according to claim 22 wherein said OP-1 receptor-binding analog comprises an antibody having binding specificity for

(i) the ligand binding domain of a cell surface receptor defined by Seq. ID Nos. 3, 5, or 7 or an OP-1 binding analog thereof; or

(ii) the receptor binding domain of OP-1, represented by Seq. ID No. 9, or a receptor-binding analog thereof.

24. Use of a protein selected from the group consisting of:

(i) a polypeptide chain comprising an amino acid sequence defined by residues 16-123 of Seq. ID No. 3 (ALK-2), or an OP1-binding analog thereof;

(ii) a polypeptide chain comprising an amino acid sequence defined by residues 24-152 of Seq. ID No. 5 (ALK-3),, or an OP1-binding analog thereof;

(iii) a polypeptide chain comprising an amino acid sequence defined by residues 23-122 of Seq. ID No. 7 (ALK-6),, or an OP1 binding analog thereof;

(iv) a polypeptide chain having binding affinity for OP-1 and sharing at least 40% amino acid identity with residues 23-122 of Seq. ID No. 7 (ALK-6),;

(v) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid obtainable by amplification with one or more primer sequences defined by Seq. ID Nos. 12-15; or

(vi) a polypeptide chain having binding affinity for OP-1 and encoded by a nucleic acid that hybridizes under stringent conditions with a nucleic acid comprising the sequence defined by nucleotides 256-552 of Seq. ID No. 7 (ALK-6),;

in a method for antagonizing

(i) OP-1 binding to a cell surface receptor; or

(ii) induction of an OP-1 mediated cellular response.

25. A method for antagonizing activin binding to a cell surface receptor, the method comprising the step of:

providing a cell expressing a said receptor with a protein having binding specificity for the amino acid sequence defined by residues 16-123 of Seq ID No. 3 or an OP-1 binding sequence variant thereof, said protein sharing at least 60% amino acid

sequence identity with residue 335-431 of the sequence defined by Seq ID No. 9,

such that said protein, when provided to said cell, is competent to interact specifically with said receptor, thereby substantially inhibiting activin binding to said receptor.

26. A method for antagonizing BMP-4 binding to a cell surface receptor, the method comprising the step of:

providing a cell expressing a said receptor with a protein having binding specificity for the ligand binding domain defined by residues 24-152 of Seq ID No. 5 (ALK-3), or residues 23-122 of Seq ID No. 7 (ALK-6), or an OP-1 binding sequence variant thereof, said protein sharing at least 60% amino acid sequence identity with residues 335-431 of the sequence defined by Seq ID No. 9,

such that said protein, when provided to said cell, is competent to interact specifically with said receptor, thereby substantially inhibiting BMP-4 binding to said receptor.

27. Use of the OP-1 receptor binding analog of claim 12-14 in the method of claim 25 or 26.